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ABSTRACT

The purpose of this paper was to provide a literary review and to create a manual explaining the difference between an interdisciplinary curriculum and other curriculum approaches. An interdisciplinary curriculum is a holistic approach that links the disciplines by emphasizing relationships and connections. A different approach to curriculum development and one that moves away from the traditional, subject-centered approach is curriculum integration. The three most common forms of integration are multidisciplinary, transdisciplinary, and interdisciplinary. The multidisciplinary approach connects two or more disciplines such as math and science. In the transdisciplinary approach, the content and the theme are the same, and there is no division between the disciplines. The interdisciplinary approach starts with the disciplines and connects them with each other, the overall theme, or the issues. Each one of the integrated approaches uses issues, problems, or themes to organize the content. The last section of the handbook contains information from discussions with 1 administrator, 8 teachers, and 12 students on the positive impacts of an interdisciplinary approach. The appendix is a manual for administrators and teachers. (Contains 55 references.) (MLF)

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THE INTERDISCIPLINARY CURRICULUM: A LITERARY REVIEW AND A MANUAL FOR ADMINISTRATORS AND TEACHERS

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INTRODUCTION

Educating the citizens of the 21st century is the primary goal of all educational organizations (Gardner, 1999). Curriculum is what teachers use to educate future citizens (McDonald, 1999), and is a reflection of the values, politics, and cultures of teachers and communities (Sizer, 1999). The values deemed important to a school and its community lead to the educational programs and curriculum (Tyler, 1949). Curriculum is the resources of time, space, teachers' knowledge and abilities, and materials designated to the education of students (McDonald, 1999). According to Oliva and Pawlas (1997), curriculum is the experiences and activities a student encounters while in the school environment. A student organizes the knowledge learned from such experiences and activities in his or her mind so it is remembered, comprehended, utilized, and relished (Sizer, 1999). The knowledge a student must organize is constantly evolving and rapidly multiplying in all areas of study (Arnold & Schell, 1999; Gardner, 1999; Jacobs; 1989; Lake, 1994); therefore, teachers must be aware of curriculum alternatives to act wisely in classroom (Hyman, 1973; Jacobs, 1989).

Alternatives to curriculum design range from discipline-specific to interdisciplinary (Jacobs, 1989). According to Tyler (1949) and Sizer (1999) the curriculum should strengthen the disciplines by tying them together with strong, meaningful threads. By using a theme that umbrellas every discipline, the learning becomes connected, focused, meaningful and relevant (Grady, 1994; Lipson, Valencia, Wixson, & Peters, 1993; Lonning, DeFranco, & Weinland, 1998). An interdisciplinary curriculum is a holistic approach that links the disciplines by emphasizing relationships and connections (Jacobs, 1989).

Fragmentation of the curriculum is one of the challenges facing educators (Bonds, Cox, & Gantt-Bonds, 1993; Jacobs, 1989; Lipson et al., 1993; Relan & Kimpston, 1993), along with the rapidly increasing knowledge (Gardner, 1999; Jacobs, 1989), and relevance of the curriculum (Jacobs, 1989; Relan & Kimpston, 1993). Today's students view the school day as a schedule of classes or subjects with math coming before recess and spelling occurring only from 1:00-1:30 (Jacobs, 1989). This fragmentation of the school day does not present a true picture of reality and the method of addressing issues in the real world. Instead, it creates a disconnected curriculum where students from kindergarten to college perform daily feats of magic by making sense of

the knowledge and content presented in classrooms (Gardner, 1999). Danger is imminent when we leap from subject to subject, thus creating miles of superficial knowledge (Dewey, 1943; Gardner, 1999; Paris & Winograd, 2000).

The problem is that educators are trying to teach too much instead of providing in-depth knowledge of fewer topics (Gardner, 1999; Tyler, 1949). This rapidly increasing knowledge presents a challenge to educators (Gardner, 1999; Jacobs, 1989). According to Gardner (1999) and Jacobs (1989), choices need to be made about what content should be taught and what should be excluded.

When making decisions concerning content, educators face the question of relevancy (Jacobs, 1989). Students call for an explanation of the curriculum with questions such as, "Why are we studying this? It doesn't seem to make any sense. How does it fit with my life?" (Brandt, 1991, p. 24). This challenge facing educators is helping students make connections and integrate their knowledge of specific disciplines into the larger world (Jacobs, 1989). An interdisciplinary curriculum highlights learning experiences that illustrate relationships between the disciplines, thus maximizing the relevancy and connections to the content (Jacobs, 1989; Lake, 1994; National

Association of Secondary School Principals [NASSP] Curriculum Report, 1992).

STATEMENT OF PURPOSE

The purpose of this paper was to provide a literary review and to create a manual explaining the difference between an interdisciplinary curriculum and other curriculum approaches. Administrators and teachers were provided with a manual to use as a resource guide to increase their knowledge of implementing an interdisciplinary curriculum and its positive impact upon teachers and students.

REVIEW OF RELATED LITERATURE

Choosing the content to be taught, and the arrangement of such content, is basic in any educational setting (Dewey, 1938). Most importantly, it is a primary curriculum matter for all educators (Hyman, 1973). Curriculum issues have been questioned, discussed, and argued over for the past century (Hatch, 1999; Sizer, 1999). The times, however, have changed, and education has entered the postmodern era with its own issues to consider (Hunkins & Hammill, 1994). Educators are becoming aware that the curriculum comes

out of the circumstances of our experiences instead of the comfortable set of steps advocated by Tyler's 1949 book, *Basic Principles of Curriculum and Instruction* (Hunkins & Hammill, 1994).

Curriculum is a decision-making process and how much to involve teachers and principals in the process is an issue facing these personnel in school districts, schools, and classrooms (Harrop, 1999). Each school community should meet to advise and direct teachers, and allow different viewpoints and thinking to shape the decisions concerning curriculum(McDonald, 1999). When different perspectives are justified through discussions, curriculum moves away from the traditional, uniform view of curriculum (Hunkins & Hammill, 1994). According to Hunkins & Hammill (1994), the curriculum must change with the times.

With the changing times comes a changing with the students.[2] Students are not willing to accept the educational process as students did years ago.[3] Students come to us with economic, cultural, religious, and familial differences.[4] Therefore, school communities should consider the whole child, the social, emotional, moral, and physical, as well as the intellectual child, when addressing school issues such as curriculum (O'Neill, 1997). This is an argument for not only involving the student in determining his or her

education, but also actively involving the student in the learning process (Beane, 1993; Benjamin, 1989; Relan & Kimpston, 1993; Thompson, 1997).

Curriculum Approaches and Curriculum Development

Each educator faces these curriculum concerns, views the issues differently, and therefore, takes a different approach to curriculum-building (Hyman, 1973). When building a curriculum, educators need varied approaches from which to choose (Hyman, 1973; Sizer, 1999). Such methods to curriculum development include approaches that are discipline-specific, multi-disciplinary, transdisciplinary, and interdisciplinary (Jacobs, 1989). Each of these curriculum design models have advantages and disadvantages, and educators make decisions for their programs based on knowledge of each method (Jacobs, 1989).

The more traditional approach to curriculum is the discipline-specific method (Fogarty, 1991; Jacobs, 1991; Relan & Kimpston, 1993). It is also known as the fragmented curriculum according to Jacobs (1989) and Fogarty (1991). In this method, each subject is determined by a specific amount of time, and students move from one subject to another, without realizing a connection between the subjects (Jacobs, 1989; Johnson, 1994; Lake, 1994).

Without the connections being made, students transfer less of their learning to new contexts (Lake, 1994). With a discipline-specific approach, teachers plan lessons with the clock and schedules in mind rather than focusing on the needs of the student (Jacobs, 1989). On the other hand, it enables the learner to explore specialized knowledge and content that has taken years to accumulate (Gardner, 1994; Jacobs, 1989). Gardner and Boix-Mansilla (1994) perceive mastery of specific disciplines essential to students attempting to approach curriculum differently.

Curriculum Integration

A different approach to curriculum development and one that moves away from the traditional, subject-centered approach is curriculum integration (Beane, 1993; Relan & Kimpston, 1993). The definitions and terms associated with curriculum integration are diverse (Fogarty, 1991; Hurley, 1999; Mansfield, 1993; Relan & Kimpston, 1993; Shoemaker, 1991). In a study conducted by Gehrke (1991), the research showed four different definitions of curriculum developed from the work of 6 teams involved in the study. Each of the 6 teams was comprised of 3-5 experienced teachers from middle and high school levels. The researcher used logs and notes to compare

and analyze each group in their planning and development of integrative curriculums. From the work of the groups, four definitions of curriculum emerged. The definitions were labeled by the researcher as concrete-relational, applicative, logical, and metaphoric. The four definitions could be placed on a continuum, with the first two definitions being more concrete, while the last two definitions were more abstract.

According to Fogarty (1991), Jacobs (1989), and Relan and Kimpston (1993), curriculum integration moves along a continuum gaining depth in knowledge along the way. The lowest form of integration occurs within a discipline where a skill or topic is connected with subsequent skills and topics within that discipline (Fogarty, 1991; Shoemaker, 1991). Sequencing lessons in corresponding disciplines so that they parallel each other is the next form of integration on the continuum (Fogarty, 1991; Jacobs, 1989; Relan & Kimpston, 1993). An example would be teaching the Revolutionary War in social studies while reading *Johnny Tremain* in language arts (Fogarty, 1991). When teachers cooperate with each other and present a theme from the perspective of each discipline, deeper integration occurs (Fogarty, 1991; Jacobs, 1989; Mansfield, 1993; Shoemaker, 1991). According to Jacobs (1989), this integration can be called complementary. The highest form of integration

on the continuum is the problem-oriented approach where the curriculum is created out of the lives of the students (Jacobs, 1989; Relan & Kimpston, 1993). Another definition of integration that can be found in all of the other approaches is skill integration known as the integration of thinking, reasoning, and problem-solving skills (Fogarty, 1991; Relan & Kimpston, 1993; Shoemaker, 1991)[5]. According to Grady (1994) and Relan and Kimpston (1993), the three most common forms of integration are multi-disciplinary, transdisciplinary, and interdisciplinary.

The multi-disciplinary approach, also known as the shared model, connects two or more disciplines such as math and science (Fogarty, 1991). According to Grady (1994) and Meeth (1978), the multi-disciplinary approach moves up the curriculum ladder by linking these disciplines under one problem or theme, but without making any conscious connections between the subjects. The connections come within the discipline content and are only connected to other disciplines by the common theme (Fogarty, 1991). Teaching a science unit on simple machines and a social studies unit on the industrial revolution under the common theme of change is an example of using a multidisciplinary approach (Fogarty, 1991).

At the top of the curriculum ladder is the transdisciplinary approach (Grady, 1994; Meeth, 1978). In this method, the content and the theme are the same, and there is no division between the disciplines (Drake, 1991; Grady, 1994). The transdisciplinary approach begins with an issue or problem and as the content within the disciplines emerges, a natural connection occurs (Benjamin, 1989; Grady, 1994; Meeth, 1978).

A link within the disciplines also takes place with the interdisciplinary approach, but instead of beginning with the problem, it starts with the disciplines and connects them with each other, the overall theme, or the issues (Drake, 1991; Jacobs, 1989). Not only does an interdisciplinary curriculum make connections between the disciplines, but also centers the curriculum around the child and actively involves the student (Thompson, 1997).

Each one of the integrated approaches uses issues, problems, or themes to organize the content (Drake, 1991; Grady, 1994; Jacobs, 1989; Meeth, 1978). Overall themes can be minor themes such as conflict, culture, or community, or the six universal themes known as patterns, relationships, systems, structures, balance, or change.[6] Once a theme has been selected, the critical attributes or generalizations of the theme are identified. The critical

attributes of a theme are characteristics or traits of the theme that never change. If communities are the theme, then some attributes of communities would be that these communities share a common purpose, are interdependent, and include structure. Finally, content-specific examples are identified to determine which disciplines will be participating in the unit.[7] A unit concludes with a summative product that begins with a problem, question, or event in the real world, and requires understanding and demonstration of mastery of the theme and its critical attributes.[8] The disciplines addressed in the unit and summative determine the approach being used: multidisciplinary, transdisciplinary, or interdisciplinary.[9]

Implementing Interdisciplinary Curriculum

Knowledge of interdisciplinary curriculum by experts in the curriculum field has grown since the late 1800s, and has been seen as an alternative to the discipline-specific model as a way of organizing the curriculum content (Wraga, 1997). Today, support and encouragement of interdisciplinary curriculum is strong (Cohen, 1978; Hatch, 1999), and implementation in various forms is increasing in numbers (Cohen, 1978). When deciding to implement an interdisciplinary curriculum, certain conditions must be

present for a successful program (Norton, 1998; Tipton, 1997).

An integrated curriculum such as interdisciplinary curriculum is a community process; therefore, it involves administrators, teachers, students, and parents in the process (NASSP Curriculum Report, 1992; Relan & Kimpston, 1993). Involvement includes participation and understanding of the changes in curriculum and instructional practices, and is a contributing factor to a successful program (NASSP Curriculum Report, 1992; Relan & Kimpston, 1993). Understanding of change comes about through open communication (Shoemaker, 1991). Newsletters and training sessions can facilitate this communication (NASSP Curriculum Report, 1992; Shoemaker, 1991).

According to Arnold and Schell (1999), educators agree that the administrator's role is of utmost importance when implementing an interdisciplinary curriculum, and support from administrative figures is vital to its success (Dougherty, 1999; Hurley, 1999; Jacobs et al., 1989; NASSP Curriculum Report, 1992; Norton, 1998; Relan & Kimpston, 1993; Tipton, 1997). A major challenge for school administrators is to make the time available for school staff to work together on school improvement in curriculum and instruction (Sebring & Bryk, 2000). According to Gehrke

(1991), teachers need time to share information about a variety of topics related to the development of an integrated curriculum, such as subject area goals and knowledge expertise. Time for educators to meet, discuss, and plan the curriculum is one positive, contributing condition for success (Jacobs, Hannah, Manfredonia, Percivalle, & Gilbert, 1989; Lake, 1994; NASSP Curriculum Report, 1992; Tipton, 1997).

Administrators can support the program by making sure time is available through block scheduling and teaming (NASSP Curriculum Report, 1992). Teaming is the organizing of teachers so that they have the same students, space, and schedule (Hall, 1998). Although, according to Golley (1997), some educators view working together as a team a displeasure, and find it difficult to adjust to working in teams (NASSP Curriculum Report, 1992; Shoemaker, 1991). Administrators may need to restructure personnel in order for teams to successfully work together in implementing interdisciplinary curriculum (Relan & Kimpston, 1993). Administrators also need to hire new teachers who will strengthen and support the implementation of the new programs (Sebring & Bryk, 2000). It is also important for administrators to monitor the curriculum implementation. According to Mojkowski (2000), administrators play a key, supportive role in

opening the lines of communication when curriculum implementations and improvements are occurring.

Equally as important to successful implementation is continuous staff development and teacher preparation (Arnold & Schell, 1999; Hurley, 1999; NASSP Curriculum Report, 1992; Norton, 1998; Relan & Kimpston, 1993)). In a study conducted by Hollingsworth, Johnson, and Smith (1998), 19 Oklahoma public school teachers were selected to participate in a two-week summer workshop on interdisciplinary active learning. The researchers hypothesized that the participants would score higher on the post-test than the pre-test in all areas. Prior to the workshop, participants were given a pretest to determine a score on their perceived knowledge, skills, and implementation of interdisciplinary active learning. These scores on the Likert scale of the Participant Information Survey were compared to post-tests given after the workshop and post-workshop activities.

A comparison group was also selected with similar backgrounds, ages, grade levels, and socioeconomic status to compare with the workshop participant group. The researchers hypothesized that the participant group would score higher on the posttest than the comparison group after training in interdisciplinary active learning.

The t-test used to examine the scores of the participant group and comparison group showed significant differences in the scores in two of the three areas: knowledge ($df=35$, $t=6.08$, $p<.001$) and skills ($df=35$, $t=5.96$, $p<.001$). In the area of implementation, no significant difference was found. When the pre-test and posttest scores of the workshop participants were tested using the t-test, there was a significant difference in all three areas: knowledge ($df=18$, $t=10.88$, $p<.05$), skills ($df=18$, $t=11.27$, $p<.05$), and implementation ($df=18$, $t=-2.76$, $p<.05$). This study concluded that teachers perceived their knowledge, skills, and implementation of interdisciplinary curriculum to have increased after initial training, post-workshop activities, and follow-up events (Hollingsworth, Johnson, & Smith, 1998). Another study conducted by Norton (1998) supports the idea of continuous training for teachers in order to have a successful interdisciplinary curriculum. Administrators can support staff development by allocating the necessary resources for successful implementation of school improvements (Sebring & Bryk, 2000).

A final contributing factor to the success of implementing an interdisciplinary curriculum is student and parental involvement. An interdisciplinary curriculum involves the students by listening to their

questions and concerns (Beane, 1993). Serious validation of student voice engages the student in the process, thus decreasing the need for disciplinary actions for behavior (Beane, 1993; Mansfield, 1993). By listening to students' questions and concerns, educators immerse the students in democratic principles (Beane, 1993). Through this democratic process, students are given opportunities to make choices within boundaries, to be coached through the process by an adult, and to respect the rights of others (Starnes & Paris, 2000). Allowing students to be a part of the curriculum development is adventurous and brave for educators (Grace, 1999). According to Grace (1999), educators must be ready to model the exploration of a topic through questioning, connecting, and sharing, and thus allowing students to follow the example set.

According to the NASSP Curriculum Report (1992), parents contribute to the success of interdisciplinary curriculums by becoming more involved in the student's education and serving as resources of information. Parents contribute to interdisciplinary units by recounting history through oral presentations and providing information on careers, hobbies, and special interests (NASSP Curriculum Report, 1992).

Impacts of an Interdisciplinary Curriculum

A successful interdisciplinary curriculum further impacts teachers and students involved in the process (Jacobs et al., 1989; NASSP Curriculum Report, 1992). Teachers become equal participating members of a team with other educators by sharing ideas and resources and supporting each other (Jacobs et al., 1989; NASSP Curriculum Report, 1992). Furthermore, educators view themselves and the students as partners in the learning process (NASSP Curriculum Report, 1992).

In addition to the impacts upon educators, students benefit from an interdisciplinary curriculum by developing and improving thinking skills such as problem-solving and critical thinking (Beane, 1993; Head, 1997; Lewis, 1998; NASSP Curriculum Report, 1992). Students benefit from an interdisciplinary curriculum because the learner's knowledge and understanding of the overall theme increases (Head, 1997; Jacobs et al., 1989). Students are better able to transfer the learning from one situation to another when the curriculum is focused around a single theme (Lipson et al., 1993). When interdisciplinary curriculum is utilized, a positive attitude

toward school and learning is apparent (Head, 1997; Jacobs et al., 1989; Mansfield, 1993).

This self-directed learning that occurs with interdisciplinary curriculum develops student confidence (NASSP Curriculum Report, 1992; Reis, Atamian, & Renzulli, 1985). In a case study conducted by Mansfield (1993), 17 fifth grade students and 10 sixth grade students perceived themselves as having more freedom and choice when involved in the interdisciplinary unit on Egypt. Through observations and open-ended interviews, Mansfield (1993) discovered three areas of change involving students. Commitment among the students to finish their work with a sense of pride was high. Students were allowed to socialize more freely, which brought about positive interaction among the students. Supportive and helping behaviors were evident among the students participating in this unit. Finally, it was noted that the students realized the difference between a fragmented day and the holistic approach of interdisciplinary curriculum. Through interviews, the students involved in this study liked centering themselves around one topic or activity within the unit until it was complete, even if completion took several days. Students involved in active participation view themselves as happier students (Mansfield, 1993).

According to Pratton and Hales (1986), active learning also impacts student learning. In their study of suburban fifth graders in Oregon, two groups were selected to study the impact of active participation on students. The researchers hypothesized that the scores of the active participant group would score higher than the non-active participant group. Five teachers not known to the students were randomly assigned to 20 classes giving each teacher 4 classes. Two of the classes were taught using active participation, and two classes were taught without active participation. The step-by-step lesson was developed by the researchers in collaboration with the teachers involved in the study, administrators, and district personnel.

At the conclusion of the lesson, students were given a multiple-choice posttest at three cognitive levels, namely knowledge, understanding, and application. They covered the six objectives of the lesson. After the posttest scores were analyzed, the t-test used to test the scores supported a significant difference among the two groups ($df=18$, $t=8.13$, $p<.001$). Therefore, the hypothesis that class achievement was greater in an active participation class as compared to no active participation was supported. However, in a study conducted by Graveline (1999) where two groups enrolled in interdisciplinary studies and two groups enrolled in the traditional program

were compared, no significant differences in student achievement were found. Although student achievement was an important issue for educators to examine when making curriculum decisions, it was only one factor to consider.

Educators should also consider making connections and actively involving the students as important issues when implementing an interdisciplinary curriculum because active learning bridges reality with knowledge by connecting the learning personally (Jacobs, 1991). Dewey (1943) challenges educators to rethink philosophies and assumptions that include teaching parts to the whole as a natural way for children to make connections. Instead, Dewey (1943) encourages educators to begin teaching with the child and actively involve the learner in the process, because this is where true learning begins.

These issues of curriculum have been discussed for years and continue to be a source of debate today (Hatch, 1999; Sizer, 1999). An interdisciplinary approach to curriculum addresses the issue of organizing the content of a curriculum.[10] This approach means organizing the content differently than the traditional discipline-specific approach (Beane, 1993; Relan & Kimpston, 1993). Such an approach prevents the curriculum from fragmentation and

the students from acquiring unrelated facts (Lipson, Valencia, Wixson, & Peters, 1993).

An interdisciplinary curriculum is a holistic approach that relates the content of one discipline to another using a theme, topic, or issue (Jacobs, 1989). Implementing an interdisciplinary curriculum involves administrators, teachers, students, and parents (Relan & Kimpston, 1993; NASSP Curriculum Report, 1992). A successful implementation relies on support from administration (Dougherty, 1999; Hurley, 1999; Jacobs et al., 1989; NASSP Curriculum Report, 1992; Norton, 1998; Relan & Kimpston, 1993; Tipton, 1997) and continuous staff development and preparation of teachers (Arnold & Schell, 1999; Hurley, 1999; NASSP Curriculum Report, 1992; Norton, 1998; Relan & Kimpston, 1993). An interdisciplinary approach allows parents to become more involved in the education of the student and the students to become partners with teachers in the learning process (NASSP Curriculum Report, 1992). The partnership that evolves from an interdisciplinary approach impacts both teachers and students (Jacobs et al., 1989, NASSP Curriculum Report, 1992).

An interdisciplinary curriculum reconstructs knowledge into tools that are beneficial to learning new knowledge (Lipson, Valencia, Wixson, &

Peters, 1993), information that is rapidly increasing in all disciplines (Arnold & Schell, 1999; Gardner, 1999; Jacobs, 1989; Lake, 1994). An interdisciplinary curriculum is an exemplary approach that addresses relevant issues not only about the students but also with the students. An interdisciplinary approach is certainly a noteworthy curriculum for the 21st century.

PROCEDURES

Educating the future citizens of this world is the primary goal of all school communities (Gardner, 1999). Education is the ability to think and use information, to organize, analyze, synthesize, and evaluate information, and to use information in meaningful and relevant ways. It is what is left when all the facts have been abandoned (Gardner, 1999). Therefore, it is the responsibility of educators to choose a method of organizing the educational content so it is relevant and understandable to learners. This method of organization becomes the curriculum (McDonald, 1999). The curriculum is what students remember, understand, use, and relish (Sizer, 1999). An interdisciplinary curriculum is a holistic approach that links the disciplines so the learning becomes connected, focused, meaningful, and relevant to

learners (Grady, 1994; Jacobs, 1989; Lipson, Valencia, Wixson, & Peters, 1993; Lonning, DeFranco, & Weinland, 1998).

Another purpose of this paper was to create a manual explaining the difference between an interdisciplinary curriculum and other curriculum approaches, implementing an interdisciplinary curriculum, and its positive impact upon teachers and students. The author's intent was that the information provided would be used by both administrators and teachers to increase their knowledge of different curriculum approaches, including the interdisciplinary approach, and how an interdisciplinary approach can have positive impacts upon the school community.

The information was summarized in a manual that was divided into two sections: an explanation of interdisciplinary curriculum, with an overview of other curriculum approaches, and implementing an interdisciplinary curriculum. Each of the sections provided information on the positive impacts of an interdisciplinary curriculum on the school community.

Both administrators and educators must be aware of the different approaches to curriculum in order to make effective decisions in classrooms (Hyman, 1973; Jacobs, 1989). Therefore, the first section of the handbook

contained some of the researched information on the various approaches to curriculum development, since the approach to curriculum utilized by educators impacts both teachers and students. This section of the handbook contained information from discussions with 1 administrator, 8 teachers, and 12 students on the positive impacts of an interdisciplinary approach. This information hopefully allows administrators and teachers to make curriculum decisions for their school community.

As with any curriculum approach, there are factors that contribute to the success of implementation. The next section of the manual listed the contributing conditions to implementing an interdisciplinary curriculum. This section also included the positive impacts of implementing an interdisciplinary approach on both the teachers and students of the school community (See Appendix).

CONCLUSIONS

The 21st century is upon us. With the changing times and issues in education comes the need to break away from tradition and enter a new era of curriculum reform. Experiences, values, and cultures, along with different perspectives, should shape the new curriculum. The new curriculum efforts

should be a community process that involves administrators, teachers, students, and parents making decisions beneficial to the community and its learners. It should be organized and presented in a way that connects learning and facilitates future knowledge.

The first step in the development of a new curriculum is awareness of the different approaches. Some school communities may choose to continue with the traditional discipline-specific approach that fragments the subjects and the school day. Other school communities will step up to the challenges of the new century and choose an integrative approach that connects the disciplines under broad, real-world issues. This approach allows teachers to maximize the amount of information presented and enables learners to acquire the ability to transfer knowledge from one discipline to another in a world with rapidly increasing information.

The next step in the development of a new curriculum would be implementing a successful program. Implementation is supported by continuous staff development. Administrators must provide ongoing staff development at least two times a year with an outside consultant. This staff development must also include the training of new staff members at the beginning of each school year. Administrators must also provide checkpoints

throughout the implementation process and hold teachers accountable for the implementation in order to make decisions about reform efforts. Formative evaluations need to be scheduled periodically to increase responsibility and engagement of the teachers. Finally, administrators can facilitate the success of implementation by providing common planning time for teams on a daily basis with additional planning time after meeting with the outside consultant.

The final step in the implementation process is securing the necessary support to promote changes in the curriculum. Access to an outside consultant to aid in the implementation process and support the teachers is necessary. Support must also come from central administration and the school board. Implementing an integrative approach may stray from the prescribed district scope and sequence; therefore, support from central administration is a must. School boards must be aware of curriculum changes in order to support and promote the school and its community. Finally, financial resources are necessary for supporting the implementation process. Financial resources assist in obtaining an outside consultant for staff development and provide the necessary material resources for implementation of the units. Support for implementations of an integrative

approach come from varied sources, and is fundamental to the success of the program.

Successful curriculum development depends upon the school community's knowledge of the various approaches and their ability to make decision based on the needs of their school community. Curriculum reform relies on support from different sources before, during, and after the implementation. Revising curriculum is a necessary endeavor that must be undertaken to prepare our future citizens and leaders of the 21st century for success.

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Footnote

[1]Dr. John Crain, an education and training consultant, was the speaker at a staff development workshop at Green Valley Elementary in Birdville Independent School District on September 15, 1997. At the workshop, Dr. Crain spoke to the faculty of several elementary schools on "An Interdisciplinary Approach: Curriculum for the 21st Century."

[2] Ibid

[3] Ibid

[4] Ibid

[5] Ibid

[6] Ibid

[7] Ibid

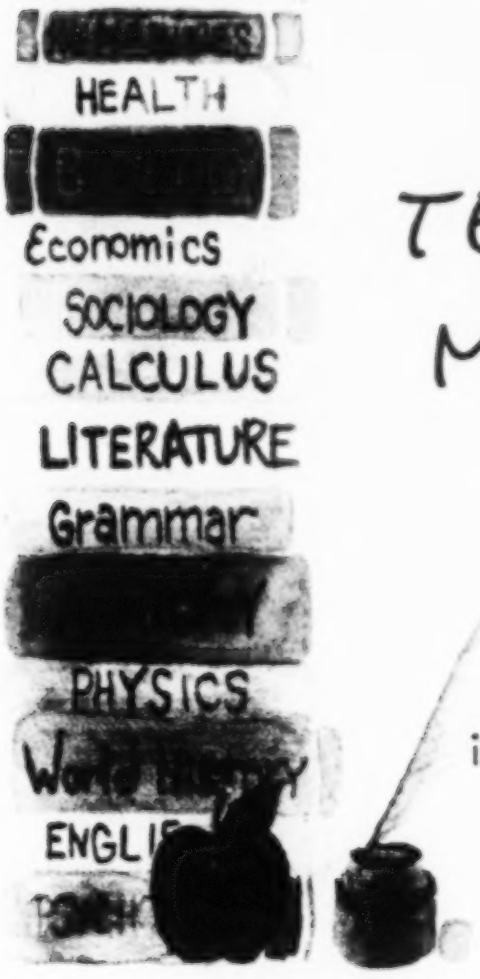
[8] Ibid

[9] Ibid

[10] Ibid

APPENDIX

ADMINISTRATOR AND TEACHER MANUAL



THE INTERDISCIPLINARY CURRICULUM

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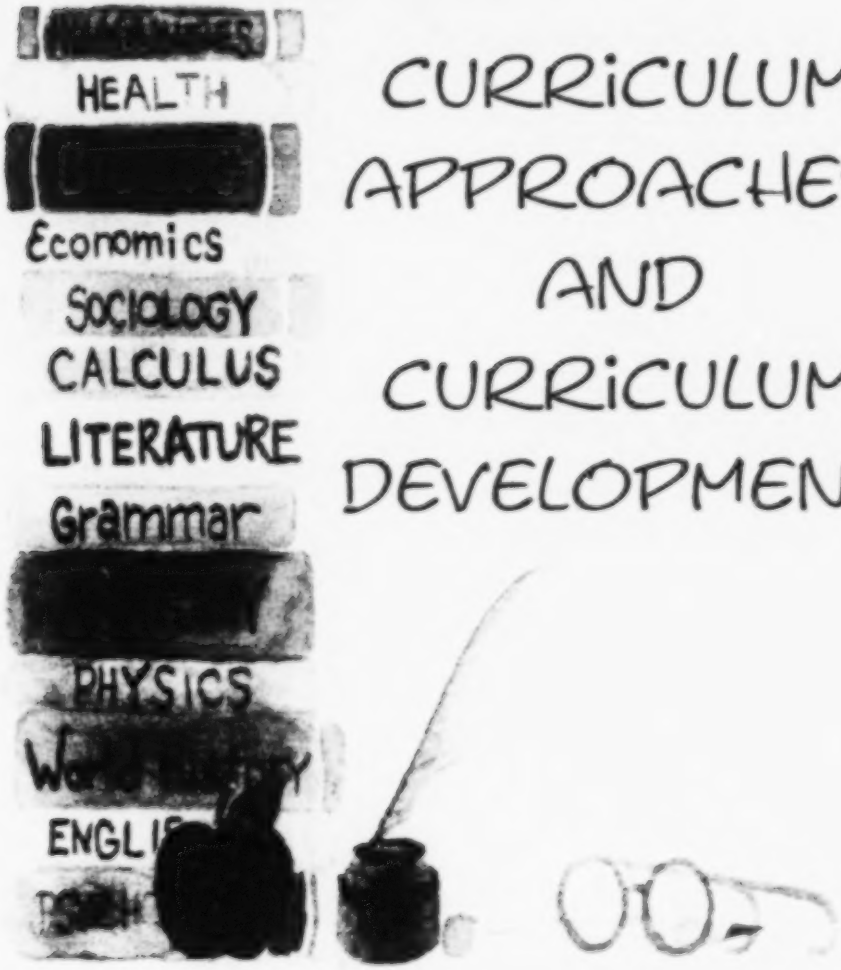
SECTION 1



CURRICULUM APPROACHES AND CURRICULUM DEVELOPMENT

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Section 1

Curriculum Approaches and Curriculum Development

Curriculum represents the resources of time, space, teachers' knowledge and abilities, and materials that are used to educate future citizens (McDonald, 1999). It is a reflection of the values, politics, and cultures of school communities (Sizer, 1999). Therefore, school communities should decide which curriculum approach to implement in classrooms, schools, and districts. Approaches to curriculum development include discipline-specific, multi-disciplinary, transdisciplinary, and interdisciplinary (Jacobs, 1989).

The following pages define each curriculum approach with a specific listing of attributes. At the end of the section are comments from informal interviews with an administrator, 8 teachers, and 12 students on the positive impacts of an interdisciplinary approach as compared to the other curriculum approaches.

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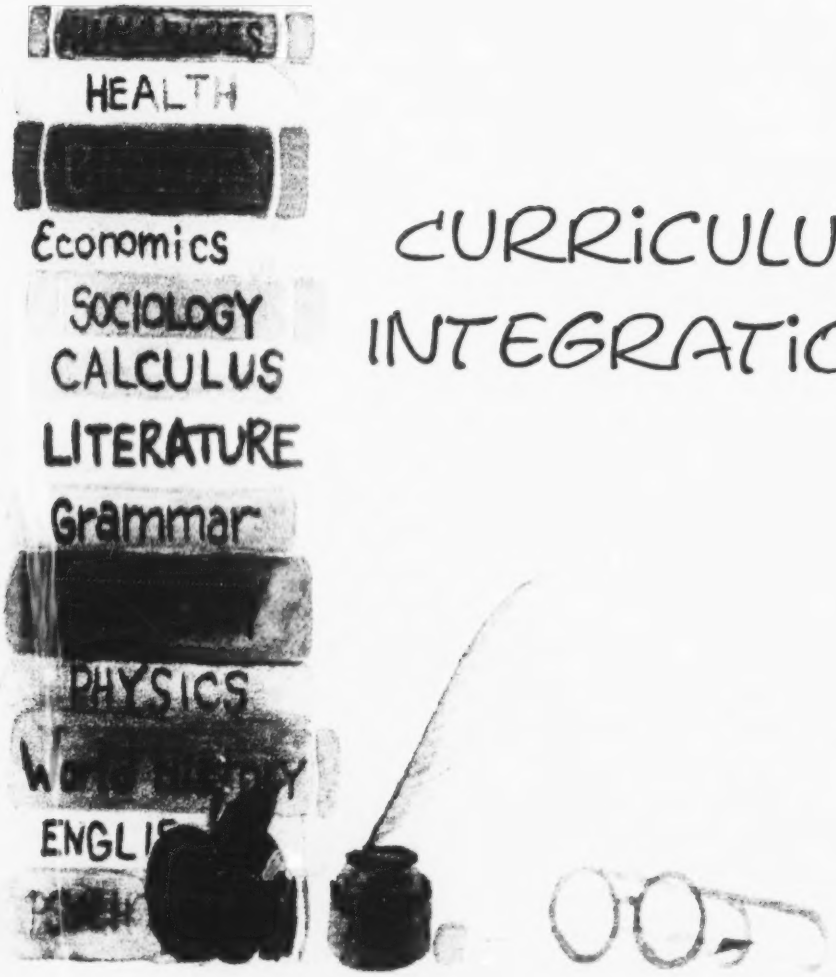
Discipline-Specific

The discipline-specific method to curriculum development is the more traditional approach (Fogarty, 1991; Jacobs, 1991; Relan & Kimpston, 1993). In this approach, each subject is determined by a specific amount of time, and students move from subject to subject without realizing any connections between the subjects (Jacobs, 1989; Johnson, 1994; Lake, 1994). The following attributes are associated with the discipline-specific approach:

- Traditional approach
- Fragmented curriculum
- Scheduled subjects
- No connections between subjects
- Specialized knowledge and explorations



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Curriculum Integration

Curriculum integration is an approach to curriculum development that is different from the traditional, subject-centered approach (Beane, 1993; Relan & Kimpston, 1993). Curriculum integration begins to make connections either within the disciplines or between the disciplines. According to Fogarty (1991), Jacobs (1989), and Relan and Kimpston (1993), each approach to curriculum integration can be found along a curriculum continuum (See Figure 1).

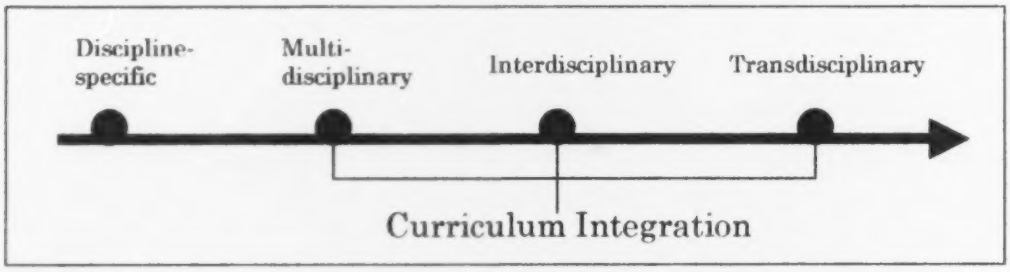


Figure 1

As the learner moves from left to right on the continuum, the learner gains knowledge and depth. The three most common forms of integration are multi-disciplinary, transdisciplinary, and interdisciplinary (Grady, 1994;

Relan & Kimpston, 1993). The next pages define each approach to curriculum integration with an appropriate listing of specific attributes.

Multi-disciplinary

When two or more disciplines are connected in curriculum development under one problem or theme, it is known as the multi-disciplinary approach (Grady, 1994; Meeth, 1978). An example would be teaching a science unit on simple machines in science, while teaching a social studies unit on the industrial revolution at the same time (Fogarty, 1991). The connection between the two disciplines comes only with the theme of change. The following attributes are associated with the multi-disciplinary approach:

- Connects two or more disciplines
- No conscious connections
- Connected by theme only

Transdisciplinary

On the far right of the curriculum development continuum is the transdisciplinary approach. In this method, the content and the theme are the same, and there is no division between the disciplines (Drake, 1991; Grady, 1994). The following attributes are associated with the transdisciplinary approach:

- No division between the disciplines
- Content and the theme are the same
- Natural connections occur

Interdisciplinary

The interdisciplinary approach to curriculum development relates the content of one discipline to another using themes, topics, or issues (Jacobs, 1989). It includes all of the disciplines in the unit of study. An interdisciplinary approach centers the curriculum around the child and actively involves the student (Thompson, 1997). The following attributes are associated with the interdisciplinary approach:

- Connects all of the disciplines
- Illustrates relationships between the disciplines
- Transfer of knowledge
- Positive attitudes towards school
- Active participation
- Connects the learning to real-world issues

Common Attributes Of Curriculum Integration

The following attributes are associated with the three most common forms of curriculum integration. According to Grady (1994) and Relan and Kimpston (1993) the most common forms of integration are known as multi-disciplinary, transdisciplinary, and interdisciplinary:

- Uses themes, problems or issues to organize the content
- Identifies critical attributes of the theme
- Determines content-specific examples for each attribute
- Concludes with a summative product to determine mastery of the theme and its critical attributes

Themes and Issues

Each of the integrated approaches to curriculum development uses themes, issues, or problems to organize the content (Drake, 1991; Grady, 1994; Jacobs, 1989; Meeth, 1978). The themes and issues can be universal, minor, or real-world. Figures 2 and 3 illustrate examples of each universal theme and some minor themes.[1] Real-world issues, which can be found in Relan and Kimpston (1993), are shown in Figure 4.

Universal Themes

Patterns
Relationships
Systems
Structures
Balance
Change

Figure 2

Figure 3

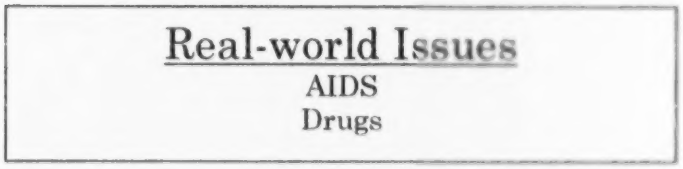


Figure 4

Informal Interviews

The following comments were selected from informal interviews conducted with an administrator, 8 teachers, and 12 students from Green Valley Elementary. Their responses were inclusive of on the impacts of an interdisciplinary curriculum as compared to other approaches.

How are interdisciplinary units different from other units?

Administrator:

- Greater student enthusiasm
- Greater student recall of knowledge
- Longer time-frame for implementation
- Less confidence in teachers' perceptions of their teaching ability
- Difficult for some teachers to implement because of lack of understanding and willingness to change

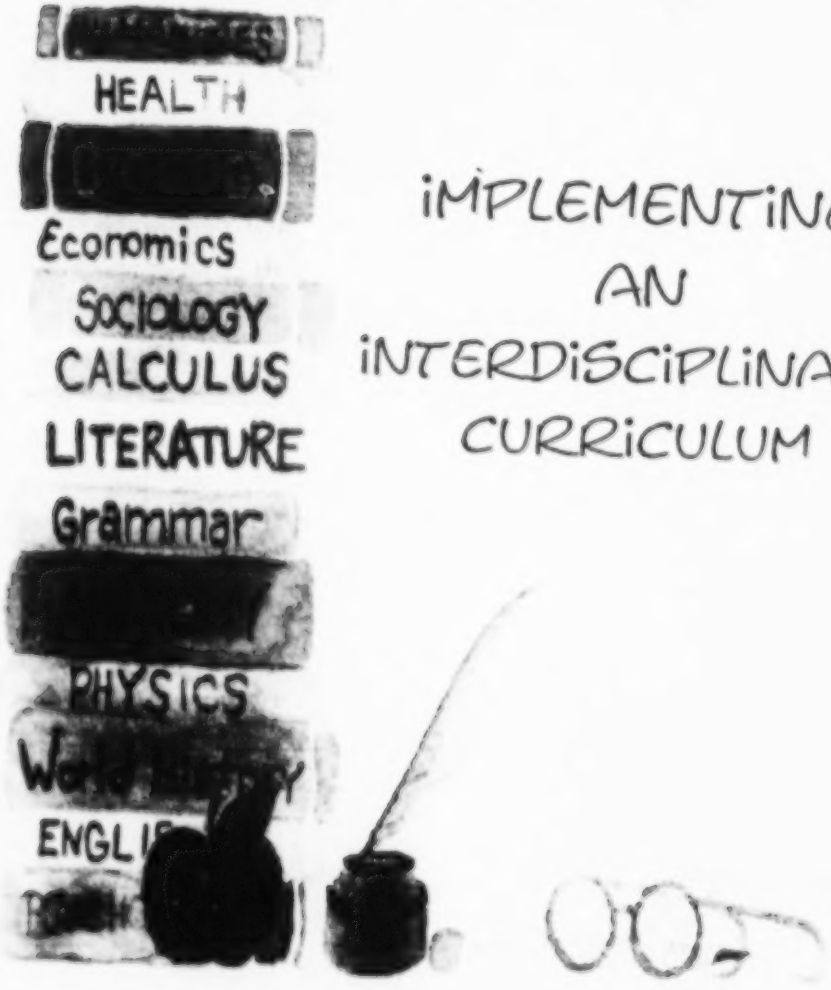
Teachers:

- More in-depth
- More choices for students
- Requires more team-planning
- More student-parent involvement
- More connections made by students between the disciplines

Students:

- Uses both sides of your brain for learning
- Learning was fun
- More involved
- More choices
- Purpose to learning
- More thinking involved

SECTION 2



IMPLEMENTING AN INTERDISCIPLINARY CURRICULUM

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Section 2
Implementing an Interdisciplinary Curriculum

Certain conditions must be present for successful implementation of an interdisciplinary curriculum (Norton, 1998; Tipton, 1997). An interdisciplinary approach is a community process that should involve administrators, teachers, students, and parents in the process (NASSP Curriculum Report, 1992; Relan & Kimpston, 1993). Each member's participation and understanding play an important part in the successful implementation of an interdisciplinary curriculum (NASSP Curriculum Report, 1992; Relan & Kimpston, 1993). A successful implementation that involves the school community impacts teachers and students involved in the process (Jacobs et al., 1989; NASSP Curriculum Report, 1992).

The following pages explain the involvement of each school community member in the implementation of an interdisciplinary curriculum and the impacts of such a curriculum on teachers and students. Selected comments from informal interviews with an administrator, 8 teachers, and 12 students from Green Valley Elementary are presented with questions relating to

contributing factors and impacts of implementing an interdisciplinary curriculum.

Administrator's Role

An administrator's role and support in the implementation of an interdisciplinary curriculum is of utmost importance to a successful program (Arnold & Schell, 1999; Dougherty, 1999; Hurley, 1999; Jacobs et al., 1989; NASSP Curriculum Report, 1992; Norton, 1998; Relan & Kimpston, 1993; Tipton, 1997). The following list includes some strategies an administrator may use for successful implementation of an interdisciplinary curriculum:

- Allow time for teachers to meet through block scheduling and teaming
- Restructure personnel for successful teams
- Hire new teachers who will strengthen and support the implementation process
- Monitor curriculum implementation

- Open the lines of communication
- Allocate resources

Administrator's Comments

These selected comments are from an administrator from Green Valley Elementary. They are inclusive of factors that focus on the implementation of an interdisciplinary curriculum.

What works when implementating an interdisciplinary curriculum?

- On-going staff development at least 2 times a year
- Training of new staff members by an outside consultant at the beginning of the school-year
- Accountability of teachers in the implementation process in order to make decisions about ongoing improvements
- Checkpoints throughout the implementation process completed by grade-level teams and reported to the principal on the degrees of implementation and difficulties
- Formative evaluation of implementation by the teachers to increase their responsibility and engagement in the process

What support would be beneficial to the implementation of an interdisciplinary curriculum?

- Outside educational consultant to aid in the implementation process and to support the teachers in the process
- Central administration to support the teachers when the curriculum differs from the district scope and sequence
- School board to support the curriculum reform efforts
- Financial resources to assist in securing outside consultant for staff development and material resources needed for the implementation of units

Teacher's Role

When implementing an interdisciplinary curriculum, teachers need time to share and discuss information about a variety of topics related to the development of an interdisciplinary curriculum (Gehrke, 1991). Allowing time for teachers to meet and plan is also important to implementation (Jacobs et al., 1989; Lake, 1994; NASSP Curriculum Report, 1992; Tipton, 1997). Equally as important to successful implementation is continuous staff development (Arnold & Schell, 1999; Hurley, 1999; NASSP Curriculum Report, 1992; Norton, 1998; Relan & Kimpston, 1993).

Teacher's Comments

The following selected comments are from informal interviews with teachers from Green Valley Elementary. They are inclusive of factors that focus on the implementation of an interdisciplinary curriculum.

What works when implementing an interdisciplinary curriculum?

- Common team-planning time daily with additional planning time at least once during a six-week period with special teachers (e.g. Music, Physical Education, Art)
- Involving community resources when expertise, special interests, or occupations are a necessary component of the unit
- Teaching the critical attributes with concrete examples at the beginning of each interdisciplinary unit

What support would be beneficial to the implementation of an interdisciplinary curriculum?

- Outside educational consultant at least 2 times a year to aid in the implementation process and to support the teachers during difficulties

- Designated team-planning time for 1 hour after meetings with outside consultant
- Campus administration to monitor the implementation process and facilitate discussion among the staff, particularly when difficulties arise and modifications are needed
- Central administration to support the teachers with the flexibility of the district scope and sequence

Students' Role

An interdisciplinary approach involves students in the curriculum process by listening to their questions and concerns (Beane, 1993). Involving the students by listening to their questions and concerns immerses the students in the democratic principles (Beane, 1993). Teachers guide students through the democratic process by allowing students to make choices within boundaries and respecting the rights of other students (Starnes & Paris, 2000).

Parent's Role

A final contributing factor to a successful implementation of an interdisciplinary curriculum is parental involvement. Parents contribute to the success of implementation by becoming more involved in the student's education and serving as resources of information such as providing oral histories and information on careers, hobbies, and special interests (NASSP Curriculum Report, 1992).

Impacts of an Interdisciplinary Curriculum

Successful implementation of an interdisciplinary curriculum impacts both teachers and students (Jacobs et al., 1989; NASSP Curriculum Report, 1992). Teachers become participating members of teams who are sharing and supporting each other in the process of planning and developing interdisciplinary units (Jacobs et al., 1989; NASSP Curriculum Report. 1992).

In addition to the impacts upon educators, students also benefit from interdisciplinary units. Students involved in interdisciplinary units develop and improve thinking skills (Beane, 1993; Head, 1997; Lewis, 1998; NASSP Curriculum Report, 1992), transfer knowledge from one situation to another (Lipson et al., 1993), and develop a positive attitude towards school and learning (Head, 1997; Jacobs et al., 1989, Mansfield, 1993). Finally, an interdisciplinary unit that actively involves the student impacts learning according to study (Pratton & Hales, 1986).

Teacher Comments on Impacts of an Interdisciplinary Curriculum

What impacts have interdisciplinary units had on you as a teacher?

- Consumes almost all of planning time, leaving no time for other duties
- Focuses the teacher on the purposes of the overall unit, and the purposes drive the activities of the unit
- Lots of work that requires additional team-planning, securing resources that are difficult to find, and grading longer, more complex products
- Challenges the teacher to keep the curriculum fresh and connected to the real-world for students
- Requires higher-level thinking in order to organize and present the concepts of the unit so that students of varying levels will understand
- Creates a feeling of frustration and inadequacy when allowing some of the students' questions and concerns to drive the unit

What impacts have interdisciplinary units had on students?

- Connects cross-curricular disciplines in concrete, understandable ways
- Challenges students to think of concepts from the perspective of different disciplines
- Improves presentation skills by allowing students a choice in the selection of a final product based on their strengths and interests

- Increases vocabulary and ability to articulate concepts, when presented using themes and from a broad perspective
- Increases awareness of real-world issues by developing the curriculum and the final product of the unit around relevant concerns
- Develops an enjoyment of learning by allowing students' questions and concerns to be addressed and validated

Student Comments on Impacts of an Interdisciplinary Curriculum

What impacts have interdisciplinary units had on you as a student?

- Gives more responsibility by requiring research and investigation of the concepts in ways other than a reading a textbook
- Allows for the perspective of the student to be seen by allowing the freedom to choose a method of presentation for the final product
- Develops decision-making skills when choices have to be made about the content of the product and the presentation
- Challenges thinking by organizing the information, figuring out what information is important and necessary, and putting it all together in a final product that shows the learning of the concepts
- Allows learning from other students when products are presented at the end of the unit